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Abstract
In the 1960's, farmers began to rely on chemical pesticides to control insects, weeds, and grasses. During the 1970's, ag chemical usage increased at an exceptionally rapid rate as more and more producers incorporated chemicals into their agronomic production practices. With this increase in demand, numerous local input and supply firms added ag chemicals and chemical application services to their product lines. Washing and mixing sites sprang up to service the growing demand for ag chemical application services. Little thought was given to the effects (either short term or long term) that accumulating concentrations of chemicals at these sites might have on ground water supplies.

Disciplines
Agricultural Science | Agronomy and Crop Sciences | Chemical Actions and Uses | Finance and Financial Management

PRELIMINARY ASSESSMENT OF THE FINANCIAL IMPACT OF CHEMICAL MIXING AND WASHING SITE REMEDIATION IN IOWA*

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ESTIMATED FINANCIAL IMPACTS OF REMEDIATING AG CHEMICAL MIXING AND WASHING SITES

In the 1960's, farmers began to rely on chemical pesticides to control insects, weeds, and grasses. During the 1970's, ag chemical usage increased at an exceptionally rapid rate as more and more producers incorporated chemicals into their agronomic production practices. With this increase in demand, numerous local input and supply firms added ag chemicals and chemical application services to their product lines.

Washing and mixing sites sprang up to service the growing demand for ag chemical application services. Little thought was given to the effects (either short term or long term) that accumulating concentrations of chemicals at these sites might have on ground water supplies.

By the mid 1980s, improved measuring and detection techniques and a recognition that such chemicals were capable of contaminating groundwater supplies led to radical changes in the way chemicals were mixed, the way they were handled, and the way equipment was washed in the mid-1980s. Much higher standards of care in these activities were established and precautions to prevent spills from moving from the site were mandated by state and federal law.

However, the fact remains that numerous sites were already in use prior to the time contamination was recognized as a problem. It is probable that a large fraction of these sites will require at least some level of remediation. In many cases, such sites have been purchased from prior owners in good faith and without knowledge that contamination and potentially large liabilities associated with clean-up existed.

Although these sites were not deliberately contaminated, it is difficult to argue

that remediation should not be made now that the existence of a contamination has been identified. The major problem becomes one of financing the costs of clean up. Its been estimated that as many as half the sites (and perhaps more than half) may require expenditures of at least $150,000. In some cases costs could be a great deal higher.

It could be argued that it is a clear responsibility of each individual firm in the industry to pay for clean-up of the sites it controls. However, large numbers of firms may not be able to absorb the costs of remediation and maintain viable business operations. In such cases their assets would have to be liquidated. In some respects, liquidation before remediation is an unacceptable solution because the sites are viewed by potential buyers (and the potential buyer's lenders) as a liability rather than an asset. Such real estate actually has a negative value in view of recent legislation at the federal level which in some events assigns liability to a purchaser or owner.

Recent court cases where lenders have been held responsible for contaminated property after a foreclosure have caused the lending community to be reluctant to view such real estate as acceptable collateral for loans. In general, lenders would rather not take a security interest in such property and assume a liability in the event foreclosure is necessary.

ESTIMATED FINANCIAL EFFECT ON IOWA INPUT SUPPLY FIRMS

In order to estimate the capacity of the various Iowa input supply and marketing firms to absorb the costs of remediation, financial statements from a random sample of Iowa firms (cooperative and proprietary) were examined. By and large, these firms were diversified locally owned ag input and marketing operations. Because there was a great deal of variation in size, the sample was divided into four categories based on annual

sales volume. They are as follows:

CATEGORY		ANNUAL SALES		
Largest	25%	$ 17,750,001	to	$ 118,961,623
Second	25%	$ 10,000,001	to	$ 17,750,000
Third	25%	$ 5,300,001	to	$ 10,000,000
Smallest	25%	$ 585,499	to	$ 5,300,000

Several financial characteristics of these four categories of firms are shown in table 1 and figure 1. The smallest firms are shown to be in the highest leverage position with about 56% debt financing. Firms in the other categories had about 44-46% debt financing on average. Figure 1 shows that fewer firms in the two larger categories had debt-to-asset ratios greater than .75.

Table 2 and figure 2 show the effect of reducing assets and owner's equity by $150,000 for each firm in the sample as a rough estimate of the effect of a single site clean-up. (Note: Debt was not increased.) It was assumed that lenders would be reluctant to lend large amounts of additional cash for remediation. There would be no additional cash flow generated from the expenditure and there would be no significant added collateral to secure the loan. These factors make loans more difficult to obtain for all but the most solvent firms.

The effect on the smallest group of firms was the most dramatic. The average debt to asset ratio for these firms increased from about .56 to about .81. The fraction of firms in the with debt-to-asset ratios of .75 and over increased from 16% to 47%. Firms in the smallest category become insolvent - 26% had a debt-asset ratio greater than 1. Firms in the third quartile were also affected but not so seriously. Although none became insolvent, 25% had a debt-asset ratio over .75 after the assumed remediation.

TABLE 1 INDUSTRY CONDITION BASED ON FIRM SIZE (MEASURED BY SALES)

	Average Sales (Mil $)	Average Total Assets (Mil $)	Average Owner Equity (Mil $)	Average Long Term Debt (000)	Total Debt to Asset		
					Average	> .75	≥ 1.0
Largest 25%	43.9	10.1	5.4	877.3	.462	1	0
Second 25%	13.8	3.8	2.2	405.9	.437	1	0
Third 25%	7.7	2.2	1.3	260.4	.435	2	0
Smallest 25%	2.7	.7	.3	174.9	.556	3	0

Figure 1

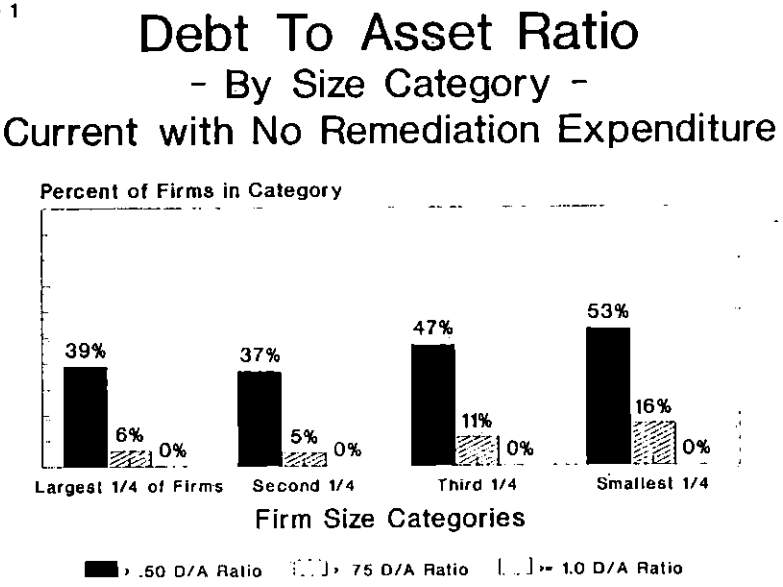


TABLE 2 INDUSTRY CONDITION BASED ON ONE SITE (AFTER $150,000 CLEAN-UP EXPENDITURE)

	Average Sales (Mil $)	Average Total Assets (Mil $)	Average Owner Equity (Mil $)	Average Long Term Debt ($000)	Total Debt to Asset		
					Average	> .75	> 1.0
Largest 25%	43.9	10.0	5.24	877.3	.47	2	0
Second 25%	13.8	3.6	2.12	405.9	.46	1	0
Third 25%	7.7	2.0	1.16	260.4	.49	5	0
Smallest 25%	2.7	.5	.17	174.9	.81	9	5

Figure 2

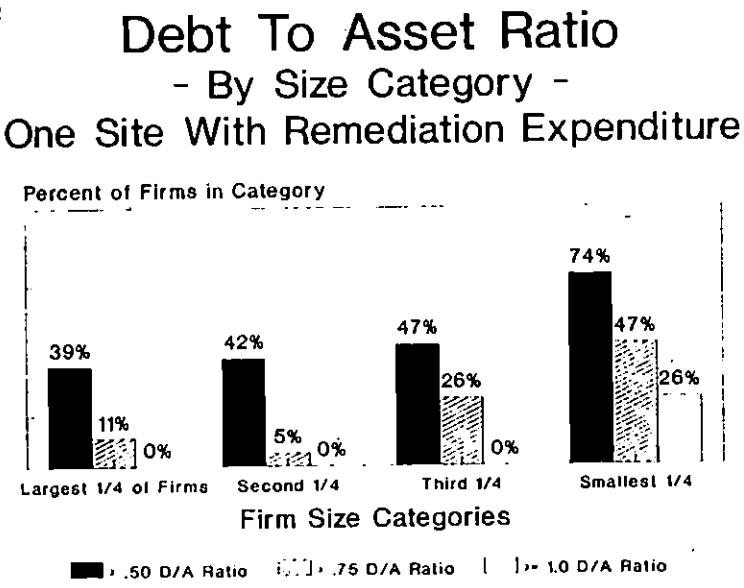


Table 3 and figure 3 show the effect if all firms with greater than $6 million annual sales are required to remediate 2 sites at $150,000 per site. (Note: the values for smallest 25% were unchanged because none had the threshold level of $6 million sales.) Effects were greatest in the second largest category and third largest category. Approximately 5% of the firms in these categories were pushed into the insolvent range.

Table 4 shows the effect when all firms with more than $12 million annual sales must remediate 3 sites at $150,000/site. Only the largest 50% of firms would be affected. None of the largest firms became insolvent but the second largest category had 5% insolvent and 16% with debt-asset ratio greater than .75.

Table 5 shows the effect on the largest 25% of firms if 4-8 sites must be remediated at $150,000/site. The assets and equity were affected slightly but not as seriously as other parts of the industry. Only about 10% of the firms would be pushed into a debt-to-asset range of more than .75 under the assumed level of remediation.

CONCLUSIONS

The preliminary analysis of financial impact shows that the smallest firms (measured by sales) would be affected most seriously. Average debt-to-asset ratios in the smallest quarter of the sample was already well above 50 and would rise to 80 if one site had to be remediated. However, averages mask the effect on individual firms. Approximately half of the firms in this category would have a debt-to-asset ratio of over .75 and about a quarter of smaller firms would become insolvent if required to pay for remediating a site.

The firms in larger size categories would also be affected but to a lesser degree. Most of the insolvencies would be confined to the smallest half of the firms. Although

TABLE 3 INDUSTRY CONDITION BASED ON TWO SITES *

	Average Sales (Mil $)	Average Total Assets (Mil $)	Average Owner Equity (Mil $)	Average Long Term Debt ($000)	Total Debt to Asset		
					Average	> .75	≥ 1.0
Largest 25%	43.9	9.83	5.08	877.3	.480	2	0
Second 25%	13.8	3.51	1.96	405.9	.488	1	1
Third 25%	7.7	1.92	1.10	260.4	.533	6	1
Smallest 25%	2.7	.5	.17	174.9	.809	9	5

* Assuming firms with more than $6 million sales clean up sites @ $150,000/site.

Figure 3

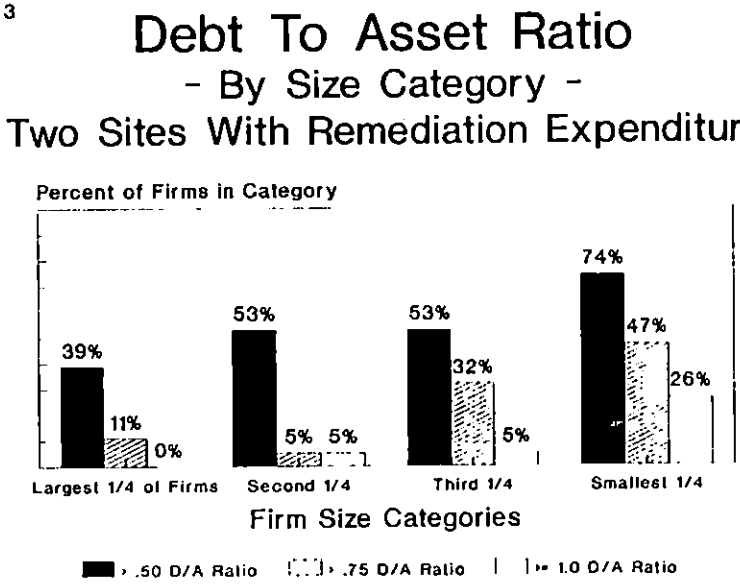


TABLE 4 INDUSTRY CONDITION BASED ON THREE SITES *

	Average Sales (Mil $)	Average Total Assets (Mil $)	Average Owner Equity (Mil $)	Average Long Term Debt ($000)	Total Debt to Asset		
					Average	> .75	> 1.0
Largest 25%	43.9	9.68	4.93	877.3	.49	2	0
Second 25%	13.8	3.4	1.85	405.9	.51	3	1
Third 25%	NA	NA	NA	NA	NA		
Smallest 25%	NA	NA	NA	NA	NA		

* Assuming all firms with more than $12 million sales clean up 3 sites @ $150,000/site.
NA = Not affected since no firm in category had greater than $12 million annual sales.

Figure 4

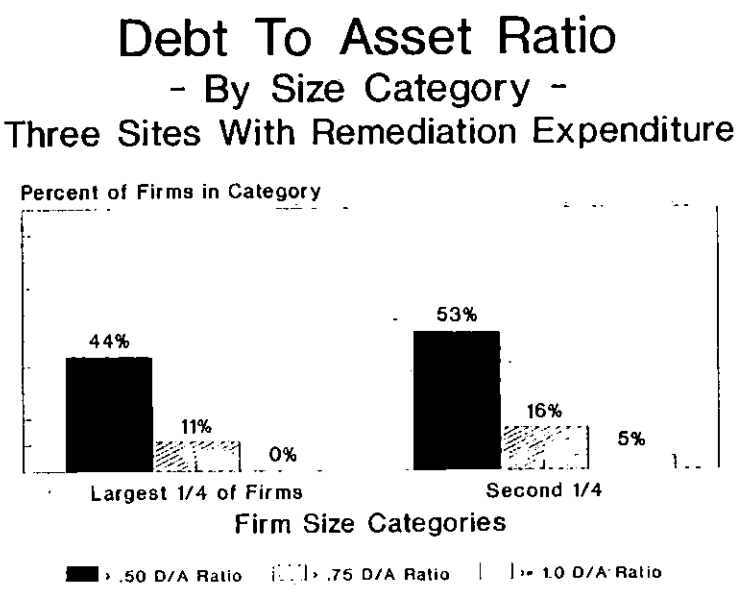
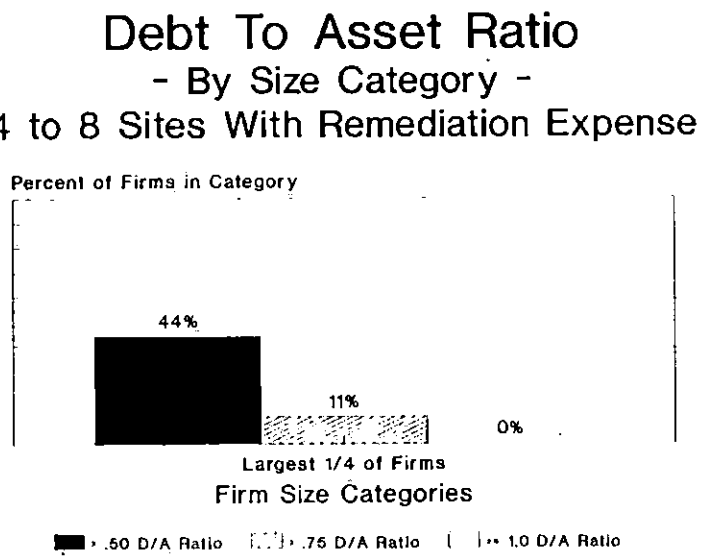


TABLE 5 INDUSTRY CONDITION BASED ON FOUR-EIGHT SITES *

	Average Sales (Mil $)	Average Total Assets (Mil $)	Average Owner Equity (Mil $)	Average Long Term Debt ($000)	Total Debt to Asset		
					Average	> .75	≥ 1.0
Largest 25%	43.9	9.4	4.68	877.3	.50	2	0
Second 25%	NA	NA	NA	NA	NA		
Third 25%	NA	NA	NA	NA	NA		
Smallest 25%	NA	NA	NA	NA	NA		

* Assuming (l) all firms with more than $20 million sales clean up 4 sites.
Assuming (2) all firms with more than $50 million sales clean up 6 sites.
Assuming (3) all firms with more than $80 million sales clean up 8 sites.
NA = Not affected because all firms in these categories had less than $20 million annual sales.

Figure 5



debt-to-asset ratios in a few of the larger firms would be pushed into dangerously high ranges the majority would not be.

Several other considerations (not directly addressed in this preliminary financial analyses) should also be noted.

1. The methods used to document the effect of cash expenditures for clean-up did not include the addition of new debt or even the maintenance of existing loans. The adjustments were made by showing a reduction in assets and a corresponding reduction in equity (owner claims) against those assets. In many cases, there may not be sufficient cash to conduct clean-up. In other cases lenders may call notes on a firm which exhausts a great deal of working capital and equity. Thus, firms with debt-to-asset ratios less than 1.0 and in some cases less than .75 may be forced to liquidate.

2. The problems of liquidating firms owning contaminated sites was not directly addressed. It is difficult to get purchasers for contaminated sites with an unknown level of liability attached. If lenders refuse to take a security interest and a purchaser cannot be found, the insolvent debtor will be left with the property. It is not unlikely that the county or a municipality will end up taking the property for taxes. The problem remains one for the community or county to solve.

At best the existence of contaminated sites is an impediment to entry and exit from the business. Prior to a purchase or a merger the buyer may need to make extensive time consuming tests and an engineering evaluation. In many cases, a severe write-down of purchase price and asset values must be made. Thus, the true financial position of many of these firms as shown on their financial statements may be badly overstated when the firm's assets are measured by market value.

3. Nor was the interaction of the fertilizer chemical activity with other lines of business addressed directly by the analyses. In many cases locally owned input supply firms are already facing severe profit pressures on the grain side of the business that were not considered. Losses on the grain side of the business would compound the effect of remediation costs on the fertilizer and ag chemical side.